

# Single Incision Laparoscopy for the Management of Postoperative Hemorrhage

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## ABSTRACT

**Introduction:** Single incision laparoscopic surgery is being used as an access route for an increasing breadth of surgical cases. However, its use to evaluate and manage postoperative hemorrhage after laparoscopic surgery has not been reported.

**Case Description:** A patient with recurrent cervical dysplasia who had undergone 2 previous cold knife conizations underwent a single incision total laparoscopic hysterectomy with right salpingectomy and left salpingo-oophorectomy. On postoperative day 1, she developed signs of intraabdominal hemorrhage. She underwent transcatheter arterial embolization of the left uterine artery and received 3U of packed red blood cells. However, on postoperative day 2, she developed signs of persistent bleeding.

**Discussion:** We discuss our management of this case with single incision laparoscopy.

**Key Words:** Single incision laparoscopy, Hysterectomy, Hemorrhage, Uterine artery embolization.

## INTRODUCTION

Single incision laparoscopic surgery is an access technique that is being used for increasingly diverse types of laparoscopic procedures. However, its use to manage postoperative hemorrhage has not been reported. Postoperative hemorrhage is a well known but uncommon complication of hysterectomy regardless of the route of surgery. Reports of the management of this complication if there is no obvious vaginal source include both laparotomy and laparoscopy.<sup>1,2</sup> Laparoscopy can be used to adequately evaluate the pelvis and the abdominal wall, which is occasionally the source of hemorrhage after laparoscopic hysterectomy. Whether the bleeding is from the abdominal wall, the surgical pedicles, or the vaginal cuff, it can be managed laparoscopically. We report a case where single incision laparoscopy was used to manage postoperative hemorrhage after total laparoscopic hysterectomy (TLH) with right salpingectomy and left salpingo-oophorectomy.

## CASE REPORT

A 42-y-old gravida 3 para 3 woman with recurrent cervical dysplasia who had undergone 2 previous cold knife conizations underwent a single incision TLH with right salpingectomy and left salpingo-oophorectomy (for bilateral hydrosalpinx and an enlarged left ovary). After the vaginal cuff closure was complete, cystoscopy revealed a normal bladder mucosa and jets of urine from bilateral ureteral orifices. Excellent hemostasis was noted at the end of the procedure with an estimated blood loss of 100mL.

On the morning of postoperative day (POD) 1, the patient had orthostatic symptoms and complained of abdominal and shoulder pain. She had also developed tachycardia, and her packed cell volume (PCV) had dropped from 41 preoperatively to 27. To try to avoid the risk of a second surgery and because the patient was maintaining a normal blood pressure, interventional radiology was consulted and a repeat PCV was obtained. The repeat PCV was 22, and the patient received 3U of packed red blood cells while undergoing embolization by interventional radiology of the left uterine artery where a blush of contrast had

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been observed. On the evening of POD 1, the patient's PCV was 32 with normal coagulation function tests. She had persistent mild tachycardia but otherwise reported that she felt much better. Six hours later her PCV was stable at 31. However, her PCV on the morning of POD 2 was 26. The patient still reported that she felt better. She continued to have mild tachycardia and a benign abdominal examination. The patient was kept with no intake by mouth, and a repeat PCV 6 h later was 20. Shortly before this laboratory sample was drawn, the patient complained of increased abdominal pain and developed guarding on her examination.

The patient was returned to the operating room for a single incision diagnostic laparoscopy for suspected intra-abdominal hemorrhage. Upon laparoscopy, the patient was noted to have approximately 3L of blood in her abdomen that was evacuated with a 5-mm suction device (Surgiflex Wave, Gyrus ACMI, Southborough, MA). Slow bleeding was noted from the left cuff angle. This was controlled with bipolar forceps. The pelvis and abdomen were irrigated well, and excellent hemostasis was noted with low pressure. Surgicel Fibrillar (Ethicon, Somerville, NJ) was placed laparoscopically over the vaginal cuff. The patient received an additional 3U of packed red blood cells intraoperatively. She tolerated the procedure well. Serial PCVs over the next 36 h remained stable from 31 to 35. Her tachycardia resolved within 2 h of completing her second surgery, and by the morning of POD 5 from her original surgery, she was discharged to home in good condition. The patient was seen 10 d later for a postoperative visit and was continuing to recover well except for a small seroma that spontaneously drained from her umbilical incision. Concern for possible cuff cellulitis also existed for which the patient received a 10-d course of oral antibiotics. This resolved, and the patient has had no further complications.

## DISCUSSION

When postoperative hemorrhage occurs after laparoscopic hysterectomy, surgical evaluation often needs to occur urgently or emergently. After evaluating the vaginal cuff and ensuring that the bleeding is not from a source that can be controlled vaginally, thorough evaluation of the abdominal wall and the surgical pedicles is paramount. The hemoperitoneum also needs to be rapidly evacuated. In the case we report, the patient previously underwent a single incision TLH and rapid access to the abdomen was easily obtained through this umbilical incision. The large hemoperitoneum was evacuated without

difficulty, and the bleeding at the left vaginal cuff angle was quickly identified and controlled with bipolar forceps.

Multiple publications by various surgical specialties have described single incision laparoscopic surgery for the management of different types of intraabdominal pathology. Several names and acronyms have been reported including single incision, single incision laparoscopic surgery, single port access, single port system, and laparoscopic single site surgery. In our case, a single-incision laparoscopic surgery port (Covidien, Dublin, Ireland) was used.

Because single incision laparoscopic surgery is used by an increasing number of surgeons and for a greater variety of cases, complications are certain to occur. Limited data are available regarding single incision complications and the management of them when using this access route. Although the efficacy and safety of using laparoscopy to evaluate postoperative hemorrhage after laparoscopic hysterectomy has been described,<sup>2</sup> the use of single incision laparoscopic surgery for this indication has not been reported. A potential concern regarding the use of single incision laparoscopic surgery to evaluate postoperative hemorrhage is the ability to quickly evacuate the hemoperitoneum, identify the source of bleeding, and control it. In our experience, a significant learning curve exists for single incision laparoscopy, and others have reported this as well.<sup>3</sup> Once one is able to comfortably manage the ergonomics of single incision laparoscopic surgery and can perform a procedure that would have previously been performed via conventional multiaccess laparoscopy, it is reasonable to conclude that a complication that can be managed by multiaccess laparoscopy can also be managed with single incision laparoscopic surgery. In our series of more than 100 single incision total laparoscopic hysterectomies, the reported case is the first one of postoperative hemorrhage, which is consistent with the rate reported by others for conventional multiaccess TLH (0.4% to 1.1%).<sup>4,5</sup> Because of our experience with single incision laparoscopic surgery, we were able to confidently address intraabdominal hemorrhage via this modality.

Arterial embolization is also an important minimally invasive option for the management of delayed postoperative hemorrhage. Transcatheter arterial embolization (TAE) has been shown to be an effective tool for the management of postoperative hemorrhage after gynecologic laparoscopy.<sup>6,7</sup> Although second surgery is often the initial choice for postoperative hemorrhage, mobilizing the surgical and anesthetic teams can occasionally be challeng-

ing. The risks of a second surgery must also be considered. In our institution, we have quick access to interventional radiology, and patients often can be in the interventional suite within a short period of time. For a patient who is hemodynamically stable but is experiencing postoperative hemorrhage, TAE is a welcome alternative to a second surgery. However, if rapid access to interventional radiology is not available or if TAE is unsuccessful, as was the case with our patient, laparoscopy can still be considered.

To avoid further risk of injury to the abdominal wall and to improve the recovery time from surgery, single incision laparoscopic surgery is a viable option for the management of hemorrhage, particularly for those patients whose original surgery was accomplished via single incision laparoscopic surgery. This avoids cosmetic changes from other incisions that many patients are concerned about. The patient may also experience less postoperative pain. However, the reported results have been mixed.<sup>8,9</sup> A potential advantage of surgical management of postoperative hemorrhage over TAE is the ability to evacuate the hemoperitoneum, which may decrease postoperative pain, the risk of infection, and the risk of ileus.

## CONCLUSION

We believe that single incision laparoscopic surgery is a reasonable and effective option for the management of postoperative hemorrhage after gynecologic laparoscopic surgery. However, we encourage surgeons to show caution in using it for this indication until they are comfortable performing single incision laparoscopic surgery procedures as efficiently and safely as conventional multiaccess laparoscopy.

## References:

1. Tomacruz RS, Bristow RE, Montz FJ. Management of pelvic hemorrhage. *Surg Clin North Am.* 2001;81:928–945.
2. Wilke I, Merker A, Schneider A. Laparoscopic treatment of hemorrhage after vaginal hysterectomy or laparoscopically assisted vaginal hysterectomy (LAVH). *Surg Endosc.* 2001;15:1144–1146.
3. Escobar PF, Starks DC, Fader AN, Barber M, Rojas-Espallat L. Single-port risk reducing salpingo-oophorectomy with and without hysterectomy: surgical outcomes and learning curve analysis. *Gynecol Oncol.* 2010;119:43–47.
4. Hill DJ, Maher PJ, Wood CE, et al. Complications of laparoscopic hysterectomy. *JAAGL.* 1994;1:159–162.
5. Holub Z, Jabor A. Laparoscopic management of bleeding after laparoscopic or vaginal hysterectomy. *JSLS.* 2004;8:235–238.
6. Takeda A, Koyama K, Mori M, Sakai K, Mitsui T, Nakamura H. Diagnostic computed tomographic angiography and therapeutic emergency transcatheter arterial embolization for management of postoperative hemorrhage after gynecologic laparoscopic surgery. *J Minim Invasive Gynecol.* 2008;15:332–341.
7. Yamashita Y, Harada M, Yamamoto H, et al. Transcatheter arterial embolization of obstetric and gynaecologic bleeding: efficacy and clinical outcome. *Br J Radiol.* 1994;67:530–534.
8. Fagotti A, Bottoni C, Vizzielli G, et al. Postoperative pain after conventional laparoscopy and laparoendoscopic single site surgery (LESS) for benign adnexal disease: a randomized trial. *Fertil Steril.* 2011;96:255–259.
9. Jung YW, Lee M, Yim GW, et al. A randomized prospective study of single-port and four-port approaches for hysterectomy in terms of postoperative pain. *Surg Endosc.* 2011;25:2462–2469.